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PATENT

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Iwamatsu

Serial No.: 09/836,857 Art Unit: 2881  
Filed: April 17, 2001 Examiner: David Vanore  
For: ELECTRON BEAM DUPLICATION LITHOGRAPHY METHOD AND APPARATUS

Mail Stop AF  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**TRANSMITTAL OF APPEAL BRIEF  
(PATENT APPLICATION - 37 CFR 1.192)**

**1. Transmitted herewith in triplicate is the APPEAL BRIEF in this application with respect to the Notice of Appeal filed on October 3, 2003.**

*NOTE: "The appellant shall, within 2 months from the date of the notice of appeal under § 1.191 in an application, reissue application, or patent under reexamination, or within the time allowed for response to the action appealed from, if such time is later, file a brief in triplicate." 37 CFR 1.192(a) (emphasis added).*

**2. STATUS OF APPLICANT**

This application is on behalf of  
 other than a small entity  
 small entity

**3. FEE FOR FILING APPEAL BRIEF**

Pursuant to 37 CFR 1.17(f) the fee for filing the Appeal Brief is:

<input checked="" type="checkbox"/> small entity	\$165.00
<input type="checkbox"/> other than a small entity	\$330.00

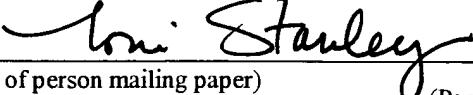
Appeal Brief fee due      \$165.00

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**CERTIFICATE OF MAILING (37 CFR § 1.8)**

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: 12-3-03

Toni Stanley  
(Type or print name of person mailing paper)  
  
(Signature of person mailing paper)

(Page 1 of 3)

#### 4. EXTENSION OF TERM

*NOTE: The time periods set forth in 37 CFR 1.192(a) are subject to the provision of § 1.136 for patent applications. 37 CFR 1.191(d). Also see Notice of November 5, 1985 (1060 O.G. 27).*

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136 apply.

*(complete (a) or (b) as applicable)*

(a)  Applicants petition for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

Extension (months)	Fee for other than small entity	Fee for small entity
<input type="checkbox"/> one month	\$ 110.00	\$ 55.00
<input type="checkbox"/> two months	\$ 420.00	\$ 210.00
<input type="checkbox"/> three months	\$ 950.00	\$ 475.00
<input type="checkbox"/> four months	\$ 1,480.00	\$ 740.00
Fee		\$ _____

If an additional extension of time is required, please consider this a petition therefor.

*(check and complete the next item, if applicable)*

An extension for \_\_\_\_\_ months has already been secured and the fee paid therefor of \$ \_\_\_\_\_ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request \$ \_\_\_\_\_  
or

(b)  Applicants believe that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicants have inadvertently overlooked the need for a petition and fee for extension of time.

#### 5. TOTAL FEE DUE

The total fee due is:

Appeal Brief fee \$165.00

Extension fee (if any) \$0.00

**TOTAL FEE DUE \$165.00**

#### 6. FEE PAYMENT

Attached is a check in the sum of \$ 165.00

Charge Account No. \_\_\_\_\_ the sum of \$0.

**A duplicate of this transmittal is attached.**

**7. FEE DEFICIENCY**

**NOTE:** *If there is a fee deficiency and there is no authorization to charge an account, additional fees are necessary to cover the additional time consumed in making up the original deficiency. If the maximum, six-month period has expired before the deficiency is noted and corrected, the application is held abandoned. In those instances where authorization to charge is included, processing delays are encountered in returning the papers to the PTO Finance Branch in order to apply these charges prior to action on the cases. Authorization to charge the deposit account for any fee deficiency should be checked. See the Notice of April 7, 1986, 1065 O.G. 31-33.*

If any additional extension and/or fee is required, this is a request therefor and to charge Account No. 23-2426 (12179-P098US).

AND/OR

If any additional fee for claims is required, charge Account No. 23-2426 (12179-P098US).

Reg. No.: 36,571  
SIGNATURE OF ATTORNEYTel. No.: (512) 370-2851

Kelly K. Kordzik  
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12179-P098US 12/03/2003



12179-P098US

PATENT

- 1 -

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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Art Unit: 2881

Examiner: David Vanore

For: ELECTRON BEAM DUPLICATION LITHOGRAPHY  
METHOD AND APPARATUS

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Commissioner for Patents  
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Alexandria, VA 22313-1450

**APPEAL BRIEF**

I. **REAL PARTY-IN-INTEREST**

The real party in interest is SI Diamond Technology, Inc., who is the assignee of the entire right and interest in the present Application.

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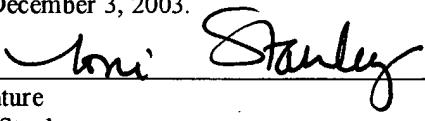
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**CERTIFICATION UNDER 37 C.F.R. § 1.8**

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Signature

Toni Stanley

(Printed name of person certifying)

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**II. RELATED APPEALS AND INTERFERENCES**

There are no appeals or interferences known to Appellants, the Appellants' legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**III. STATUS OF CLAIMS**

Claims 1-9 are pending in the Application, and also stand rejected.

**IV. STATUS OF AMENDMENTS**

There were no amendments to the claims or Specification filed after the final rejection.

**V. SUMMARY OF THE INVENTION**

The present invention provides an electron beam duplication lithography apparatus and method (FIG. 1) for focusing electrons emitted from a mask plate 10 as a result of an application of an electric field between a mask plate 10 and a duplication plate 13. The result is that a congruent or similar pattern is lithographed by electron beam exposure onto an electron beam resist film 14 from a field emission film 12 having the congruent or similar pattern to be created.

Because there is no use of a photo cathode, it is possible to realize a longer lifetime of the mask plate 10. Moreover, it is possible to construct the mask plate 10 using a conductive substrate 11 or having a conductive film coated glass substrate or ceramic substrate or a metal substrate, at a lower cost. Moreover, it is possible to achieve higher current densities with a field emitter 12, resulting in a lessening of the exposure time of the resist film 14, resulting in a faster lithography process, which will increase the manufacturing throughput.

Because the mask plate 10 surface is flat, it is possible to more effectively duplicate in a one-to-one manner, plus there is no inherent limit to the size of the cathode. The whole pattern can be exposed in parts of it at a time. It is also possible to realize more precise duplication lithography below the 0.1 micrometer level.

A field emission device can use low work function materials, such as a diamond-like carbon thin film. As a result, the two plates 10, 13 can be positioned closer together resulting in higher current densities, resulting in the increased efficiency, all without a degradation of the mask plate 10, since the diamond-like carbon thin film 12 is more resistant to damage over its lifetime.

#### VI. ISSUES

1. Are claims 1-9 properly rejected under 35 U.S.C. § 102(b) as being clearly anticipated by *Baylor et al.* (USP 5,892,231)?
2. Is claim 5 properly rejected under 35 U.S.C. § 103 as being unpatentable over *Baylor*?

#### VII. GROUPING OF CLAIMS

Claims 1, 4, 5, 6, 7 and 8 are to be considered individually per the reasons set forth in Section VIII.

## VIII. ARGUMENT

### 1. Claims 1-9 are not properly rejected under 35 U.S.C. § 102(b) as being clearly anticipated by *Baylor*.

Claim 1 recites that all of the field emission material deposited on the first substrate in the predefined pattern on a permanent basis emits electrons on a continuous basis when activated. The Examiner asserts that when a current is applied to the emitters 431-434 in *Baylor*, they continuously emit electrons. Applicants respectfully disagree. The device in *Baylor* is a digitally addressable array of electron emitters configurable in a variety of shapes so that when a particular shape of an electron beam is desired, selected ones of the electron emitters will be activated to create such desired shape. In such a case, there will be certain ones of the electron emitters that are not activated. So, for example, the *Baylor* invention of FIGURE 5 overcomes the prior art shown in FIGURE 3 of *Baylor* whereby if a T design is desired, the square-shaped electron beam will have to be repeated for various portions of the T design. With the *Baylor* invention, only the emitters 431-434 making up the T design will be activated so that the entire T design can be emitted as an electron beam in that shape. In such a case, there will be electron emitters that are not activated in *Baylor*. Claim 1 recites that all of the field emission material will emit electrons on a continuous basis when activated. This is not taught within *Baylor*, since *Baylor* teaches that not all of the field emitters will be addressed to emit electrons, but instead, some of them will not be activated to define the desired pattern.

With respect to claim 4, the Examiner asserts that the connections 530 represent the conductive layer between the first substrate 510 and the field emitter 431. Clearly from FIGURE 5, such connections 530 are not a conductive layer that is between substrate 510 and the field emitter 431.

With respect to claim 6, the grids 441-444 are not deposited on the substrate 510.

With respect to claim 7, the Examiner has glossed over these claim limitations; clearly from FIGURE 5, the grid portions 441-444 do not cover edges of the field emitters 431-434. Further, with respect to claim 8, the Examiner has again glossed over these claim limitations. Clearly, the surfaces of the grid materials 441-444 are not coplanar with the emitting surface of the field emitters 431-434.

2. Claim 5 is not properly rejected under 35 U.S.C. § 103 as being unpatentable over *Baylor*.

With respect to claim 5, the Examiner has made some type of assertion that failure to traverse the rejection of claim 5 has now made the limitations of claim 5 acquiring the status of admitted prior art. Applicants respectfully request the Examiner to cite some type of authority for such an assertion. Claim 5 is dependent upon claim 1, which was amended. Therefore, claim 5 has a different scope than originally filed.

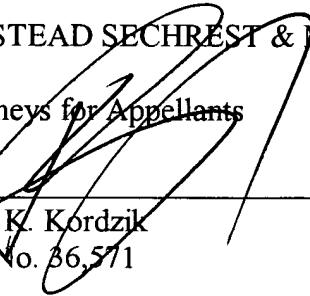
Claim 5 recites a conductive layer between the second substrate and the electron beam resist layer. There is no such conductive layer between the second substrate and the electron beam resist layer in *Baylor*. The Examiner cites the *Chan*, *Borel*, and *Huang* references that the limitations of claim 5 would be obvious to one of ordinary skill in the art. However, the Examiner has not officially cited these references in the rejection of claim 5 under § 103. Therefore, the Examiner has not set forth a *prima facie* case of obviousness.

Respectfully submitted,

WINSTEAD SECHREST & MINICK P.C.

Attorneys for Appellants

By:

  
Kelly K. Kordzik  
Reg. No. 36,571

P.O. Box 50784  
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Dallas, Texas 75201  
(512) 370-2851

APPENDIX

- 1        1.: An electron beam duplication lithography apparatus comprising:  
2            a first substrate;  
3            a field emitter deposited on the first substrate in a predefined pattern whereby  
4            an active field emission material is deposited on the first substrate in the predefined  
5            pattern on a permanent basis such that all of such field emission material emits  
6            electrons on a continuous basis when activated, and whereby no active field emission  
7            material resides in spaces between the predefined pattern so that no field emission of  
8            electrons occurs in such spaces;  
9            a second substrate positioned a distance from the first substrate;  
10          an electron beam resist layer deposited on the second substrate; and  
11          circuitry for establishing an electric field to thereby cause an emission of  
12          electron beams from the active field emission material towards the electron beam  
13          resist layer in order to modify the electron beam resist layer in a pattern substantially  
14          identical to the predefined pattern.
  
- 1        2. The apparatus as recited in claim 1, further comprising a magnetic field  
2          lens positioned to focus the electron beams as they are emitted from the field emitter  
3          towards the electron beam resist layer.
  
- 1        3. The apparatus as recited in claim 1, further comprising an electric field lens  
2          positioned to focus the electron beams as they are emitted from the field emitter  
3          towards the electron beam resist layer.
  
- 1        4. The apparatus as recited in claim 1, wherein the establishing circuitry  
2          further comprises a conductive layer between the first substrate and the field emitter.

1           5. The apparatus as recited in claim 1, wherein the establishing circuitry  
2 further comprises a conductive layer between the second substrate and the electron  
3 beam resist layer.

1           6. The apparatus as recited in claim 1, further comprising a conductive or  
2 dielectric material deposited on the first substrate between portions of the patterned  
3 field emitter.

1           7. The apparatus as recited in claim 6, wherein the conductive or dielectric  
2 material covers edges of the field emitter

1           8. The apparatus as recited in claim 6, wherein a surface of the conductive or  
2 dielectric material is coplanar with a emitting surface of the field emitter.

1           9. The apparatus as recited in claim 6, wherein an emitting surface of the field  
2 emitter is recessed below a surface of the conductive or dielectric material.

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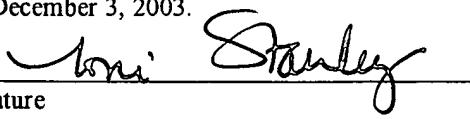
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